E-voting critic Avi Rubin describes the critical need for audit trails and the 'perfect storm' of the 2000 election.

COMPUTERWORLD

IT Schools To Watch

Take a look inside the classrooms at these high-tech, Web-savvy schools.

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AUGUST 18, 2008
VOL. 42, NO. 33 $5/COPY

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IT SCHOOLS TO WATCH 2008

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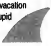

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COVER ILLUSTRATION BY WILLIAM DUKE

EDITOR'S NOTE

Don Tennant

Weight of Intransigence

IN MAY, in a column titled "Strengths and Weaknesses," I wrote about having learned that those two things can often be one and the same. At the time, I didn't fully appreciate just how often.

My subject then was Robert Madge, founder of the once highflying Token Ring networking company Madge Networks. I had spoken with him about the rise and fall of his company. What led to both, I learned, was his unwavering, single-minded focus on the company's positioning as an independent Token Ring vendor.

"If you step back and look at it, a logical move for a company whose technology is going into decline . . . would be to merge with or be sold to another company," Madge told me. "In hindsight, it would have been the logical course."

In the end, the same stubbornness that got him to the top took the bottom out from under him.

"People's weaknesses and strengths are normally the same things," Madge said. "The reason why I didn't see the writing on the wall, when the best thing to do was to sell the company, is probably the same reason why I built the company in the first place."

If there's one person in the technology sector who needs to think long and hard about that lesson, it's Richard Stallman.

I wrote about Stallman in my "Standing on Principle" column last week. Founder of the GNU Project and an outspoken champion of the free software movement, Stallman is well known for his passionate distaste for proprietary software.

He told me in an interview that he believes proprietary software is unethical and unjust because it subjugates the user. "It's better not to use computers than to use proprietary software," Stallman proclaimed.

The column drew some interesting feedback from readers on both sides of the issue, including one who wrote that, thanks to the GNU Project, "we have a phenomenal blend of free software that allows for the creation of an incredible computing environment." But most couldn't get past the extremism.

An e-mail exchange indicated to me that Stallman equates nonendorsement of his views with hostility.

"I'm all for the free and open-source movements because they create competition. But saying that commercial software subjugates the user is way over the top," wrote a reader who said he's spent his entire professional career working with software. "The important freedom I enjoy is being free to embrace all forms of creative endeavor. To eschew one over the other because it is proprietary verges on the irrational. To insist that only your point of view is correct is a form of arrogance. To claim that 'it's better not to use computers than to use proprietary software' is foolishness. I detest fanaticism in any form."

While I don't disagree with any of those opinions, I was unwilling to simply write Stallman off as a fanatic. Instead, citing his commitment to the principles he believes in, I said I respect him and that he has earned the admiration of his many supporters.

But there's another part to this story, and it's the part that Stallman would be well advised to ponder. His own reaction to last week's column came in the form of an e-mail with the subject line "Hostile article."

"I read [the column] and was struck by the hostility of it," Stallman wrote. "Its main topic is that you think my views are 'over the top.' "

What I actually wrote was the rather obvious statement that most everyone would find his "better not to use computers" contention to be over the top. The theme of my column, in fact, was that Stallman is a man who stands by his principles.

Yet Stallman was so blindly focused on the perceived challenge to his views that he couldn't see that. A subsequent e-mail exchange indicated to me that Stallman equates nonendorsement of his views with hostility.

Stallman needs to recognize that the singularity of focus that built the free software movement must now give way to the accommodation of other views. Otherwise, that movement will collapse under the weight of its own intransigence. Just ask Robert Madge. ■

Don Tennant *is editorial director of* Computerworld *and* InfoWorld. *Contact him at don_tennant@computerworld.com, and visit his blog at* http://blogs.computerworld.com/tennant.

■ ONLINE CHATTER

RESPONSE TO:

Fostering Accountability

Aug. 4, 2008

At times, I think accountability is like frosting, something that people think they can put on later.

For example, we have asked our application teams to use clustered MQ queues so that their services are not tied to just one server location. Some are resisting, and when we had an outage, we all suffered.

It is death by a thousand cuts. All the little things add up to a slow system, but no single item stands out. When it's just a bunch of little choices made along the way, no one is really accountable.

■ **Submitted by:** *HenryS*

RESPONSE TO:

Encryption Not A Snap for Feds

Aug. 4, 2008

Encrypting all info on a laptop is a good idea if there is info that needs to be encrypted. Most laptops in my agency have no information on them — they are used as Web browsers. Encrypting those is a waste of taxpayer money. We're going slow, hoping someone somewhere in some security agency comes to their senses.

■ **Submitted by:** *MikeM*

RESPONSE TO:

Stock Exchanges Start Thinking in Microseconds

Aug. 4, 2008

Systems with hundreds of thousands of interconnects, running many millions of lines of code, are far more dependent on software architecture and data structures for their speed than a few microseconds of response time from a storage system. Any manager who has mounted projects to quantify the level of dependent threading in their code base and cache miss rates is not understanding the real issues of submicrosecond computing.

■ **Submitted by:** *Skylab*

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Free XP Tuneup: Put New Life Into an Old Workhorse

Just because Microsoft is done with Windows XP doesn't mean you have to be. Keep XP in the game with these downloads, tweaks and hacks.

The True Origins of the Personal Computer

The x86's lineage can be traced back to 1968, to a design drawn on a napkin by Austin O. "Gus" Roche, an all-but-forgotten engineer in San Antonio who was obsessed with creating a computer for personal use.

Invasion of th Large-Screen Notebooks

All but the kitchen sink: Three full-featured notebook PCs prove that bigger really can be better. They offer everything you need, including 18-in. (or larger) displays, fast processors, multiple hard drives and TV tuners.

Tech Visionary Wayne Green: Still on a Mission

Ham radio enthusiast Wayne Green helped develop the PC, the cell phone and technology publishing. Still going strong at 86, Green has a few choice words for the high-tech industries he was once part of.

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Subscriptions and back issues (888) 559-7327, cw@omeda.com

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News Digest

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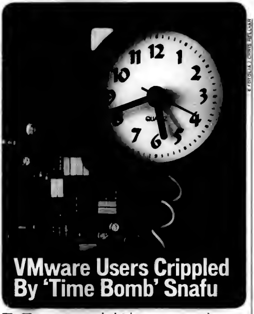
THE WEEK AHEAD

MONDAY: The Data Warehousing Institute kicks off its TDWI World Conference in San Diego.

TUESDAY: The Intel Developer Forum opens in San Francisco; as part of the conference, Intel is expected to announce the first of its new Core i7 processors, code-named Nehalem.

TUESDAY: Hewlett-Packard plans to report financial results for its fiscal third quarter. Also scheduled to file an earnings report this week is Salesforce.com, on Wednesday.



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VMware Users Crippled By 'Time Bomb' Snafu

VMWARE INC. rushed out an emergency patch last week after a software-development snafu crippled the virtual servers of some users, who flooded the vendor's support forums with posts about the problem.

The glitch also prompted Paul Maritz, VMware's new CEO, to publicly apologize in the company's executive blog shortly before midnight Eastern time last Tuesday — just minutes after the so-called express patch became available.

"We are doing everything in our power to make sure this doesn't happen again," wrote Maritz, who replaced ousted VMware co-founder Diane Greene in early July. He apologized for the "disruption and difficulty" and said that the virtualization market leader is reviewing its quality assurance and software-release processes.

Maritz acknowledged that in recent updates of VMware's ESX 3.5 and ESXi 3.5 products, developers neglected to remove code that prevented users from powering up their virtual machines when the calendar flipped to Aug. 12. Affected users, who saw error messages claiming that their software licenses had expired, also couldn't take virtual servers out of suspend mode or use VMware's VMotion migration tool to move them to other physical systems.

Although it's common for software developers to code a time limit into beta releases to force users to install the final version of a product, such automated deadlines — often called "time bombs" — are supposed to be removed at the end of the beta process.

After the patch was issued, a user identified as Robert-Greenlee said in a message on a support forum that he had successfully updated ESX 3.5 on one of his host systems. "Unfortunately," he added, addressing VMware, "I think you've gotten a serious black eye today. We were finally getting management happy with the idea of using ESX for production servers, and this set us back."

He wasn't the only one taking shots at VMware over the problem, which left some virtual servers unusable for more than 20 hours.

"This will cast doubt about the reliability of VMware in the enterprise," wrote a VMware consultant and business partner using the name "wwcusa."

— Gregg Keizer

SECURITY

Microsoft Puts Out 11 Fixes, Pulls Another

In its largest batch of security fixes in 18 months, Microsoft Corp. last week released 11 software updates to plug 26 holes in Windows, Office, Internet Explorer and other products.

Six of the updates were tagged "critical," Microsoft's highest severity rating. And the company acknowledged that at least two of the vulnerabilities being patched have already been exploited by attackers in the wild.

> **Andrew Storms of nCircle said 'a few' replacement patches aren't unusual, but seven is 'a full deck.'**

This month's update count was supposed to be even larger: Microsoft said it decided not to issue an expected fix for Windows Media Player 11 "because of a last-minute quality issue."

Andrew Storms, director of security operations at nCircle Network Security Inc., noted that seven of the 11 updates replace earlier patches from Microsoft.

- GREGG KEIZER

Some things are better left alone.

Before you start that big transition to VoIP, hold the phone. It may not be the grand reconstruction project they've been talking about. Simply stated, it isn't about ripping and replacing or big, upfront costs. That's because it isn't about hardware. It's actually about software. Now you can keep your hardware—your PBX, your gateways, even your phones. Move to VoIP with software. Software integrates with Active Directory,® Microsoft® Office, [illegible] Exchange Server, and your PBX. Maximize your [illegible] investment and make it part of your new [illegible] VoIP solution from Microsoft. It's big change, [illegible] changing it all. Learn more at microsoft.com/voip

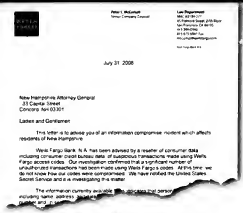
Your [illegible]

Microsoft

■ **NEWS DIGEST**

CYBERCRIME

Wells Fargo Codes Used To Access Personal Information



Peter L. McCorkell
Senior Company Counsel

Law Department

July 31 2008

New Hampshire Attorney General
33 Capital Street
Concord NH 03301

Ladies and Gentlemen

This letter is to advise you of an information compromise incident which affects residents of New Hampshire

Wells Fargo Bank N.A. has been advised by a reseller of consumer data including consumer credit bureau data of suspicious transactions made using Wells Fargo access codes. Our investigation confirmed that a significant number of unauthorized transactions had been made using Wells Fargo's codes. At this time we do not know how our codes were compromised. We have notified the United States Secret Service and it is investigating this matter

The information currently available

WELLS FARGO Bank NA is notifying some 7,000 people that their Social Security numbers and other personal information may have been accessed by thieves using the financial services firm's access codes.

The bank learned of the compromise on July 1 from MicroBilt Corp., a reseller of consumer data, according to a Wells Fargo spokeswoman. MicroBilt notified Wells Fargo of suspicious transactions made on its site using the bank's access codes, she said.

The codes are used by certain Wells Fargo employees to access MicroBilt's consumer credit data.

The spokeswoman noted that the accessed records belonged to "random individuals," only a small number of whom were Wells Fargo customers.

"There is a full investigation under way to find out who is behind this," the spokeswoman said. Investigators have not yet determined how the Wells Fargo access credentials were illegally obtained, she added.

The compromise was first reported by The Breach Blog, which posted a link to a July 31 letter in which Wells Fargo notified New Hampshire Attorney General Kelly Ayotte that nine state residents were affected by the breach.

New Hampshire law requires companies to notify the state of breaches that expose the personal information of residents.

In the letter, Peter McCorkell, Wells Fargo's senior corporate counsel, disclosed that "a significant number of unauthorized transactions had been made using Wells Fargo's codes." He said that Social Security numbers, birth dates, addresses, driver's license numbers and, in some cases, credit account information had been accessed.

The letter also said that the bank has contact information for only about 2,400 of the affected individuals.

In a letter sent to the victims whose addresses were available, Sherry Courtney, a Wells Fargo senior vice president, offered a year's subscription to credit-monitoring services.

Since 2004, Wells Fargo has suffered through a string of breaches, mostly involving lost or stolen computers, that led to the loss of personal data.

— Jaikumar Vijayan

Short Takes

has filed a counterclaim to a March lawsuit in which charged that the software vendor fraudulently promised that an ERP implementation would meet the trash disposal company's needs. SAP contends that Waste Management understood the risks of the software and failed to define its requirements in a timely fashion.

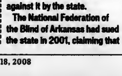
The has temporarily held up the extradition of U.K. citizen , who faces charges of hacking U.S. military computers.

A lawsuit filed against , which is being acquired by , charges that the data warehouse appliance vendor is using patented technology developed by , which once employed Datallegro's founder.

has agreed to buy , a maker of 802.11n wireless access infrastructure products, for an undisclosed sum.

SOFTWARE

SAP Agrees to Fix Arkansas ERP System



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SAP AG has agreed to upgrade the SAP R/3-based Arkansas Administrative Statewide Information System (AASIS) by adding support for text-to-speech screen-access technology so blind people can use all features of the state's ERP backbone.

The vendor will also replace the R/3 software with its SAP ERP 6.0 product as part of a deal reached earlier this month to settle a complaint filed against it by the state.

The National Federation of the Blind of Arkansas had sued the state in 2001, claiming that the AASIS system was not fully accessible to blind people. The state, in turn, filed a third-party claim against SAP, blaming the vendor for the problems.

Under the Aug. 1 settlement, SAP must complete the work by Aug. 1, 2009.

In a statement, SAP said that it "is pleased that all parties have reached a settlement." The company declined further comment. Arkansas officials refused to discuss the deal.

The settlement resolves the lawsuit filed against the state by the NFB of Arkansas on behalf of two blind state employees who couldn't use some key AASIS functions.

The plaintiffs' attorney, Joseph Espo of Baltimore law firm Brown, Goldstein & Levy LLP, said that SAP failed to link R/3 to the accessibility tools, making AASIS incapable of converting data on computer screens into synthesized speech or another medium.

- BRIAN FONSECA

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surging stocks
storm coming
28 “urgent” e-mails
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ninth-inning upset
[illegible] e-cards

Sprint

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MAINFRAMES

Winn-Dixie IT Shifts From A Liability to an Asset

CHARLES WESTON took the job as group vice president of IT at Winn-Dixie Stores Inc. only a few months before the supermarket chain filed for Chapter 11 bankruptcy protection in February 2005. For some people, that might have been bad timing, but for Weston, it was a chance to reshape IT.

He said troubled IT operations had contributed to the financial woes, and quick work was needed to fix things. "I think [IT] fundamentally contributed to the bankruptcy," Weston said. The company's green-screen applications were a quarter of a century old, and a single job could involve logging onto five screens, he said.

A key early decision, Weston said, was to continue using mainframe technology rather than shift to a distributed server environment.

Weston said Winn-Dixie upgraded to an IBM System z9 in late 2006, around the time it exited bankruptcy protection. The company concluded that a single mainframe was more cost-effective than clusters of new servers, he said.

Weston wouldn't disclose return-on-investment estimates, but he noted that margins in grocery stores are tight, and the cost of managing distributed servers is not low. Winn-Dixie has been profitable since 2006.

The new IBM computer was used to consolidate applications from two older mainframes, including ERP and financial tools and an IBM DB2 database.

IBM cites Winn-Dixie as evidence that the mainframe is thriving. Indeed, IDC estimated IBM mainframe hardware and z/OS software revenue at $4.6 billion last year, and it expects a slight increase this year — but it projects a slow decline for mainframe sales in the long term. "It has surprised me that we have seen as much [mainframe sales] as we have [lately]," said IDC analyst Stephen Josselyn.

— Patrick Thibodeau

BETWEEN THE LINES *By John Klossner*

said it will begin selling the iPhone 3G on Sept. 7, making it the first company other than

and carrier

to sell the device in the U.S.

Despite the sour economy, worldwide shipments of PC microprocessors grew a higher-than-expected

in the second quarter, market research firm IDC said.

A blackout extending from the Northeast to the Midwest left 50 million customers in eight U.S. states and Ontario without power and triggered IT disaster recovery plans at numerous companies.

Global Dispatches

London Dumps Card Contractor

LONDON – Transport for London last week disclosed plans to end its contract with TranSys, the consortium in charge of maintaining its Oyster card fare payment system. The termination comes after the smart-card technology failed twice last month.

In a statement, the city transit agency said it is dumping the contract with the consortium led by Electronic Data Systems Corp. and Cubic Transportation Systems Inc. so it can provide "enhanced services for less money."

The agency did not comment on the system failures.

A TranSys spokesperson acknowledged that the consortium has received notice that the contract will be terminated and said the system "will continue to operate and deliver for the next two years."

The Oyster card was introduced in 2003, and there are now more than 6 million cards that are used 38 million times a week, the agency said.

Siobhan Chapman,
Computerworld U.K.

Agency Loses Data On 3,000 Workers

LONDON – The U.K. Home Office this month disclosed that two unencrypted CDs containing the personal information of some 3,000 seasonal agricultural workers were lost in transit to the U.K. Border Agency in March.

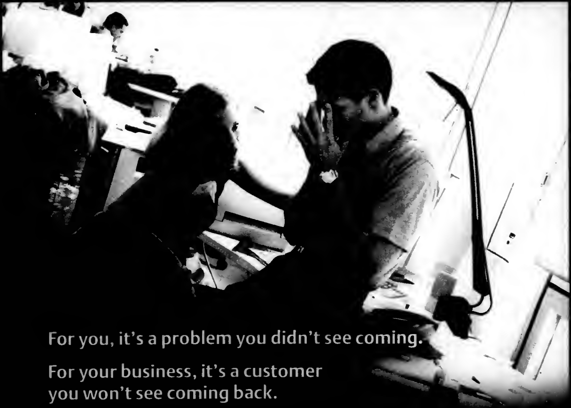
The incident was reported to the Information Commissioner's Office but was only disclosed in the Home Office 2007-2008 resource accounts, which were published Aug. 8. The data was lost before the government began requiring that an encryption service be used for all data transported from agency offices.

Computerworld U.K. staff

BRIEFLY NOTED

Christine Connelly was named CIO of the U.K. National Health Service. She replaces Richard Granger, who resigned from the position six months ago. Connelly was previously CIO at Cadbury Schweppes and an IT executive at BP PLC.

Lee King,
Computerworld U.K.



For you, it's a problem you didn't see coming.

For your business, it's a customer you won't see coming back.

You can't anticipate every problem. But Emerson Network Power and its Liebert power and cooling technologies can help you create an IT infrastructure that's ready for anything: unplanned outages, unpredictable growth or unexpected technologies.

One example is the **Liebert NX**, a software-scalable UPS that can double in capacity without adding or modifying hardware. Download our white paper, *Powering Change in the Data Center*, and discover what Liebert technologies can do for your operating flexibility at flexibility.liebert.com

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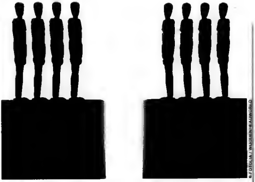

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Flap Over Transit Flaws Exposes Disclosure Divide

A court order stopped a Defcon presentation, reigniting the debate over responsible security disclosures. The verdict: still no common ground. **By Jaikumar Vijayan**

A COURT ORDER put a stop to a planned presentation at the Defcon hackers convention by three MIT students who found security flaws in the electronic ticketing system used by the mass transit authority in Boston. But the ruling reopened the schism in the IT security community over the issue of how vulnerabilities should be publicly disclosed.

Critics of the temporary restraining order, issued on Aug. 9, by a federal judge in Boston, labeled it an infringement of the students' First Amendment rights and an example of prior restraint on free speech. Many said such actions leave vulnerable systems open to attackers and put a chill on security research, driving legitimate researchers underground.

Others, though, saw the case involving the students and the Massachusetts Bay Transportation Authority (MBTA) as another example of publicity-hungry security researchers driven more by ego and the desire for fame than by any sincere interest in improving security.

The disclosure debate boiled over again after the MBTA obtained the 10-day order barring the MIT undergrads — Zack Anderson, Russell "RJ" Ryan and Alessandro Chiesa — from publicly disclosing information about the flaws in its e-ticketing system. The gag order was handed down the day before a scheduled Defcon session in which the students planned to detail the holes, which they said they found during independent penetration testing.

In an affidavit, the MBTA claimed that the students didn't give it sufficient information about the vulnerabilities beforehand. The transit authority added that it wasn't trying to permanently gag the students, but that it wanted some time to determine the validity and seriousness of the flaws and a course of action for addressing them.

But the Electronic Frontier Foundation (EFF), a high-tech civil rights group that is defending the three students, contended that the gag order was unconstitutional and wholly unnecessary. Some of the material that the students planned to present had been previously published elsewhere, the EFF noted. And, it said, the students had told the MBTA that they wouldn't release technical details that hackers could use to take advantage of the flaws.

Bruce Schneier, chief security technology officer at BT Group PLC, joined 10 computer science professors and researchers in signing a letter opposing the restraining order that the EFF included as part of a motion to reconsider the decision. Schneier said last week that publicly disclosing vulnerabilities is often the only way to prod businesses to address them.

"Companies won't make [their systems] better by themselves," Schneier said. MBTA officials, he claimed, "are counting on the legal system to protect their shoddy work" on IT security.

As long as the students didn't plan to use what they had discovered for malicious purposes, they had every right to talk about it, asserted Jim Kirby, a senior network engineer at DataWare Services, an IT services firm in Sioux Falls, S.D. "Anyone who says otherwise is invited to read the Constitution," Kirby said, adding that the restraining order was an effort "to enforce security by obscurity."

Other critics pointed out that much of the information had already become public, since the students' slides were included on a CD given to Defcon attendees. In fact, the MBTA asked the court to modify the gag order so it covered only "nonpublic" information. A hearing was held on Thursday, but the order was left in place as is.

On the other side of the debate, David Jordan, chief information security officer for Virginia's Arlington County, said the reasonable course of action would have been for the students to help the MBTA address the flaws before disclosing them.

"When you discover major flaws in a system, you go to the people who own the system and work with them," he said. "You don't stand up on a podium and say, 'Look how clever I am.' "

The students did meet with an MBTA police officer and FBI agent on Aug. 4 and then delivered a short report on their findings to the MBTA prior to Defcon, according to the EFF.

But Gartner Inc. analyst John Pescatore said the MBTA wasn't given a reasonable amount of time to fix the problems or develop work-arounds for them. The intent of disclosing flaws should be to make systems more secure, "not to make headlines or sell tickets to security conferences," he added. "The students went for publicity." ■

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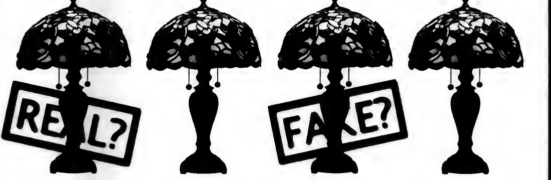

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A legal battle over sales of counterfeit luxury goods on eBay could have far-reaching implications for trademark owners — or for eBay itself.

By Linda Rosencrance

LAST MONTH, a federal judge ruled that eBay Inc. had fulfilled its obligations to investigate and control users who were trying to use its Web site to sell counterfeit Tiffany goods — a decision that put the onus on Tiffany & Co. to monitor eBay's site itself.

The ruling by U.S. District Judge Richard Sullivan was a major victory for eBay in its fight with Tiffany and other luxury goods companies over the sale of their merchandise — counterfeit or otherwise — on its auction site. If the ruling stands, it could have big implications for trademark owners, which would have to deploy technology to scour eBay's site for counterfeit and pirated goods, have employees manually monitor the site or pay other companies to watch it for them.

But similar lawsuits filed against eBay in French and German courts haven't turned out in eBay's favor, resulting in a split decision internationally — and the possibility that in the end, eBay might have to bite the bullet and increase its own enforcement efforts.

On June 30, two weeks before Sullivan sided with eBay, the French Tribunal de Commerce in Paris ordered eBay to pay a group of companies a total of $61 million because it failed to stop counterfeit perfumes and other products from being sold through its site. That followed a similar, though much smaller, judgment against eBay by another French court in early June.

And last year, a court in Cologne, Germany, ruled that once eBay's subsidiaries in that country were notified that fake Rolex watches were being sold on the eBay Germany site, the company should have taken measures to prevent the recurrence of counterfeit Rolex postings.

The financial stakes are high on both sides of the legal dispute. Tiffany, which last week filed an appeal of Sullivan's ruling in the U.S. Court of Appeals in New York, said that in the five years before the lawsuit was filed in 2004, it spent $14 million on technology and manpower to police its trademarks on eBay's site.

But between $3 million and $5 million of Tiffany's spending was on the lawsuit itself, and Sullivan described the New York-based company's overall monitoring tab as "relatively modest" in his ruling.

Meanwhile, eBay, which is appealing the European court decisions, said it spends $20 million annually to identify counterfeit goods on its site. That figure would likely increase substantially if eBay were forced to take on more responsibility for rooting out sales of fake products. And the company probably would have to change the way it handles counterfeiting across the board, not just in those two countries.

"EBay operates on one technology platform, and to the extent that eBay has to change its business model in other countries — it would change it everywhere," said Heather McDonald, an attorney at law firm Baker & Hostetler LLP in Cleveland.

McDonald, who specializes in intellectual property

a Case of 'Not My Job'

enforcement and anticounterfeiting litigation, added that if eBay didn't do so, trademark owners in the U.S. could argue that the company was offering more protections to foreign businesses than it was to them.

"If we have to change our business in relation to [the Tribunal de Commerce's] ruling, it will be a massive undertaking," eBay spokeswoman Nichola Sharpe acknowledged. "We don't view it as just affecting eBay France, but affecting all eBay sites globally."

McDonald and other legal experts said the different rulings weren't surprising, because European courts typically take a stricter stance against trademark infringement and the sale of counterfeit goods than their U.S. counterparts do.

On the other hand, eBay said the ruling in the U.S. case confirms what it has maintained all along: that its efforts to stop counterfeit sales have been reasonable. According to Sharpe, eBay removed 2.2 million potentially counterfeit listings worldwide last year alone. It also suspended about 50,000 sellers who were found to be offering fake goods and took steps to make it harder to post such items, she said.

One of the ways that eBay tries to stop the sale of counterfeit goods is through its Verified Rights Owner Program, or VeRO, which provides software tools to help companies look for fake goods on its site. More than 18,000 businesses take part in VeRO, eBay said; if a company determines that a seller is peddling counterfeit merchandise, it notifies eBay, which immediately takes down the auction.

McDonald said businesses that want to invest in a technical solution to the monitoring problem can write algorithms that automatically scan eBay for listings with their brand names, then dump the information into spreadsheets so workers can determine whether the products are counterfeit.

Ethan Horwitz, an intellectual property attorney at King & Spalding LLP in Atlanta, said trademark owners also can buy packaged software from vendors such as MarkMonitor Inc. and OpSec Security Group PLC that combs the Web and finds uses of their brand names. Or, they can hire services firms to do the online sleuthing for them, he said.

Over a period of about 18 months, the Software & Information Industry Association spent hundreds of thousands of dollars to develop a tool to help it check for counterfeit or pirated software on eBay's site — money that the SIIA said should have come out of eBay's pockets.

The SIIA last month threatened to sue eBay over the issue. Like Tiffany, the trade group contended that eBay is making money from the sale of counterfeit and pirated goods and thus should bear the financial burden of stopping such sales.

"At some point, the trademark and copyright owner has done as much as possible," said Keith Kupferschmid, the SIIA's vice president of intellectual property policy and enforcement. "There's so much piracy on the site that eBay really needs to do something [more] about it."

But the ruling in the U.S. case instead reinforced the position that trademark owners have to bear most of the expense of monitoring third-party Web sites.

"[Tiffany] complained, and the court basically said, 'Tough,'" said Eric Goldman, assistant professor and director of the High Tech Law Institute at the Santa Clara University School of Law.

Sullivan's position is that eBay has to be the enforcer but not the detective, noted Horwitz. That puts the burden on trademark owners to do their own investigating of items listed on the eBay site, he said.

At least in the U.S. And at least for now — until the appeals process decides who really should be minding the online auction store. ■

Tiffany Says eBay Can't Ignore Fake Goods on Site

In its appeal of U.S. District Judge Richard Sullivan's ruling in favor of eBay, Tiffany argues that trademark law doesn't allow online auction sites to turn a blind eye to the problem of counterfeit goods.

James Spire, a partner at Washington law firm Arnold & Porter LLP who is representing Tiffany in the case, said that prior court decisions have held that flea market operators and store owners have "a duty to investigate and take action" if they know of a problem with counterfeiting. "In neither instance is there any obligation on the trademark owner to investigate what is happening on-site," he added.

But Tiffany is fighting an uphill battle on the appeal, according to Ethan Horwitz, an intellectual property attorney at law firm King & Spalding. Horwitz said Sullivan's ruling was a "well-reasoned decision" with a solid legal basis for its finding that Tiffany had done "very little, if anything," to protect its trademarks.

Eric Goldman, an assistant professor and director of the High Tech Law Institute at the Santa Clara University School of Law, agreed that the ruling was "almost uniformly thoughtful, thorough and well researched. It looks like the judge intentionally wrote it to be as appealproof as possible."

But Goldman added that if Tiffany does lose on appeal, he wouldn't be surprised to see the battle move to Congress.

In a statement, eBay said Tiffany's appeal "doesn't do anything to combat counterfeiting." The best way to stop the sale of fake goods, it added, is "ongoing collaboration between companies, government agencies and law enforcement."

– LINDA ROSENCRANCE

On the Mark

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MATTHEW FAULKNER

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That's why a free monitoring service from Hyperic Inc. in San Francisco is worth a look. Jon Travis, principal engineer, says Hyperic's CloudStatus keeps an eye on the I/O condition of your applications in Amazon's S3 storage cloud or the connectivity of APIs in EC2, among other things. If there's trouble, CloudStatus quickly lets you know where the problem is. That info alone can save you significant troubleshooting time.

5
Number of Amazon cloud services monitored by Hyperic's CloudStatus.

Currently, CloudStatus monitors only the health of Amazon services. But Travis says Google offerings, such as App Engine, are up next.

And don't forget — it's free.

IT à la Carte

Digital Fuel Technologies Inc. has been shipping its ServiceFlow software to IT groups for a few years as a packaged application. Now you can subscribe to it as a service.

Yisrael Danczíger, CEO of the San Mateo, Calif.-based vendor, says ServiceFlow helps CIOs "run IT like a business." That is, through its catalog, service-level management (SLM) and finance modules, you can give your customers (end users) the ability to pick the apps that they have the rights to access. They can see how well IT is delivering on its service commitments via the SLM. And business unit managers can see the true costs of the IT software and services their groups use.

Danczíger: Order up business service management as if you're dining out.

In the SaaS version of ServiceFlow, Digital Fuel has prepopulated the catalog menu with 80 IT services, such as e-mail or desktop backup, along with full descriptions and even cost data. Danczíger says the company's experience with so many IT operations over the years gives Digital Fuel insight into what most companies will want to offer their users.

Digital Fuel's SaaS offering starts at $200 per user.

R&D on Rise in India

Forget your anachronistic attitudes about Indian IT workers. They aren't just handling technical support calls or testing code written elsewhere. Some are doing the fundamental R&D for the next generation of IT tools destined for your data center.

According to research released this month by Zinnov LLC in Bangalore, R&D in India is worth an impressive $9.3 billion this year, and that figure will rise to $21.4 billion in 2012. Granted, that's well below the $367 billion expected to be spent in the U.S. on all forms of R&D in 2008. But the U.S. growth rate is shrinking and well under India's 23% growth rate for IT R&D.

1.5M
Number of Indian professionals working in IT, Zinnov estimates.

"The work in India has moved up the value chain," says Vamsee Tirukkala, managing principal at Zinnov, who notes that the number of R&D centers in India has jumped from 181 in 2000 to 594 today — a sign of a significant shift in the IT tasks being done there. Cost is no longer the primary driver behind moving work to India. Good thing, since employee costs rose 16.2% between 2005 and 2007. Still, Tirukkala estimates that the average R&D engineer in India earns $44,000, about one-third the U.S. average.

Two things India lacks, Tirukkala says, are an entrepreneurial culture and a vibrant venture capital community. That's why so many Indian entrepreneurs arrive on these shores to build their businesses. But he says that over the years, as many as 30,000 expat Indians have returned home flush with experience, including a track record in building companies as well as products. ■

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■ **THE GRILL**

Avi Rubin

The e-voting critic talks about the **inherent weakness of software,** the critical need for **audit trails** and the 'perfect storm' of the **2000 election.**

Dossier

Name: Aviel "Avi" Rubin

Title: Professor of computer science; technical director, Johns Hopkins University Information Security Institute

Organization: Johns Hopkins University

Location: Baltimore

Something people may not know about him: He's president of Independent Security Evaluators LLC, which helps corporations find and fix internal security problems. He has a policy of not working with e-voting businesses.

Hobbies: Soccer, tennis, golf and photography

Passion: Sailing; he just bought his first boat, a 40-foot sloop.

Last book read: *Man's Search for Meaning*, by Viktor Frankl

For more than a decade, Avi Rubin has been a vocal critic of e-voting systems across the nation. In 2006, he wrote Brave New Ballot: The Battle to Safeguard Democracy in the Age of Electronic Voting, *which heavily criticized e-voting machines for security and reliability shortcomings.*

How do you think e-voting went this primary election season? You can run an election and say that it appears to have gone fine, but we don't really know.

E-voting advocates and vendors say that security concerns are the stuff of conspiracy theorists. I would ask those people if they would be willing to allow their bank accounts to be unauditable. And if they would give up on getting any confirmation of their ATM transactions.

We need to have a system [we can] audit to be sure that the machines got the right result. People who have a lot of experience with computers and security know that it's not always a good idea to trust the machines.

Are there systems today that you would be comfortable with? Definitely. I've

Continued on page 18

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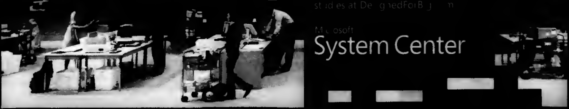

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BRYAN BURRIS

“People who have a lot of experience with computers and security know that it’s not always a good idea to trust the machines.

Continued from page 16

seen designs of voting systems that I’d be happy with. I don’t think anything is totally secure. Ultimately, I think the goal is to do the best we can.

What needs to be done differently? The National Institute of Standards and Technology identified what I think is a breakthrough property in an e-voting machine, which is the idea of making it software-independent. That means a software failure does not have any possible impact on the accuracy and integrity of the election.

How would that work? Voters use a touch screen to make their selections, and the machine prints a paper ballot that has all the choices that they made. If the software on that system fails, they wouldn’t get a printed ballot that they could approve. The voter then takes the printed ballot and puts it into a scanner. The scanner tallies the ballots.

After the election, you pick a bunch of scanners randomly and audit them. You compare the totals. In any stage of the process, a flaw in the software will prevent you from proceeding.

Now compare that to an existing direct recording electronic touchscreen machine. The voter comes in and marks his or her choices, and they are stored on a magnetic card on the inside of the machine, and at the end of the day, the voting officials get the card, and it has all the tallies.

Any flaw in the software could potentially change all the tallies or record the votes incorrectly, and there would be no checks against that because there is no paper record of the actual choices made by the voters.

Based on your concerns, can we be sure that the right people won this year’s primaries? I don’t doubt that the right people won. I use several factors for that. One is that we seem to be getting the results that are indicated by all the polls. If [Dennis] Kucinich won the Democratic primary race, then I would say something went wrong.

But isn’t using paper ballots again, even as just a backup, going backward? No. You don’t need to audit that large a sample to get confidence about the whole result, as long as you sample randomly.

Is this something we can do now? We can do it now. The system that I described has achieved software independence. It’s like you have a high wire and you put a net under it. You’re using the high wire, but you’re not relying on it for your security.

So IT should still play an important role in making our election system more secure and reliable in this country? Yes, I wouldn’t want to try to build a voting system without technology. I think if you take a different philosophy toward building systems, where you say, “We’re going to use software as much as we can, but we’re not going to rely on it for security,” you will actually design a pretty good voting system.

Do you recommend that any changes be made now, before the November elections? You don’t want to start changing your voting systems [now]. I think we can put audits and observation in place and gather statistics and do good exit polling. I think the odds of a disaster are actually higher if we try to switch voting systems now than if we just go with what we have.

So are we better now than we were in Florida in 2000, where the winner of the race eventually had to be determined by the U.S. Supreme Court? Much better. Most states have switched to paper records. That was the perfect storm of problems. They were using punch cards that were poorly designed. Every technology can be designed well or badly. And it can be used well or badly.

I think we also learned a lot about voting, and election officials have learned more about technology. So I think we are through the hardest part.

And now most states have switched to paper-based optical-scan systems? Right. There are only a few that are still all-electronic, including Tennessee and Maryland. But both have laws to switch in 2010.

So maybe we aren’t that far away from making the system safer and more secure. Yeah, I’m much more optimistic than I was a few years ago.

Do you have advice for Americans to help make their elections more secure and reliable? I would say get involved. Become an election worker. I’ve found it to be extremely satisfying. I’ve been doing it since 2004. The best way to ensure that whatever system we do have is properly used and properly audited is to be part of that.

— *Interview by* **Todd R. Weiss**

OPINION

Bruce A. Stewart

When Projects Are Just Make-Work

I'VE BEEN seeing things lately that make the old software company CEO in me want to start screaming, "Change, or I'll get someone else who can actually do your job."

What has me so riled, as I visit the IT shops of my clients, is a lot of wasted energy. People are assigned to projects, sometimes for years at a time, that are just fantasies.

Who gets the blame for this foolishness? There's enough to go around for both the business and IT.

I see long lists of projects that are officially under way but have no funding — and no plan for funding. Despite that lack of a key ingredient — money — periodic meetings are held, minutes are published, studies are done.

In one case I know of, four IT people are tied up for the third year in a row on a project that still hasn't made the cut in the corporate plan.

The business wants and even needs this project. But the corporation needs other things more, so it waits. No progress is made, but everyone looks busy. Make-work maintains the fantasy that this project will someday matter enough to be funded. And maintaining the fantasy is all it does. None of the work being done will cut the project's time frame should it ever receive funding; it will all need to be redone later.

Even presuming that such IT work is useful, these practices are institutionalizing massive underemployment. One of my financial services clients has projected that it will need to expand the key control field of the account number about five years from now. Four people from IT are working on figuring out all the implications of doing this, meeting regularly and filing status reports.

Meanwhile, the company doesn't intend to provide the capital for this project until the need is pressing. One person could do this work while the other three contribute value elsewhere. But it doesn't happen that way — and that's typical.

■ No progress is made, but everyone looks busy, and the fantasy is maintained.

Why are four people doing make-work toward a future project and nothing else? The explanations I've heard expose the folly of inflexibility. It may be that 20 years or so ago, the needs of two important projects collided. The same people were needed on both, and the result was a major executive battle. Since then, there's been an unwritten rule about never exposing IT to that kind of conflict again.

Then there's the notion, often found in IT, that everything is an add-on that can be accommodated by expanding the existing system. That works for a while, but eventually you end up with 30-year-old code bases with more patches than an equally old tire. What drives this is the typical IT professional's tendency to mistakenly place a higher value on technology than on the work he does. But then, it's often easier to produce the business-case numbers the corporation wants from IT by fudging the true life-cycle cost of such decisions. The business and IT collude in making the economic performance of the corporation worse.

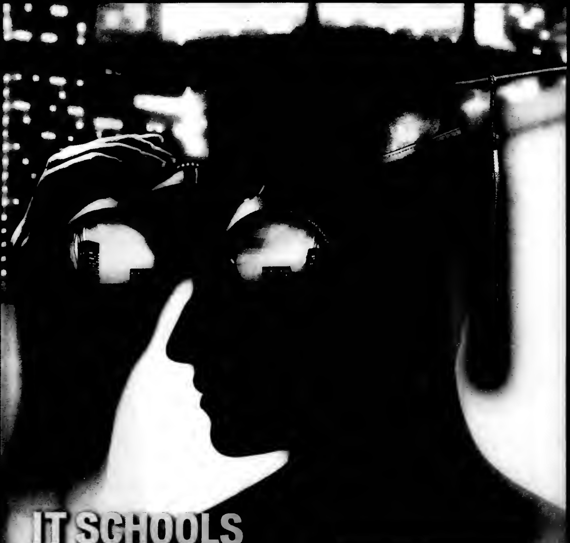
They collude, too, when it comes to progress reports. That project for a simple field expansion may have only been under discussion for the past two years, and two more may pass before it gets a nickel of funding, but all those reports let the business say it's making progress.

I see this sort of thing in business after business. Companies with over 200 IT projects in progress say things are going well, even though more than 80% of those projects are unfunded and, to an outsider, quarterly progress seems minimal at best. It just makes me queasy.

I could go on, but I think you're getting the picture. There's a failure of management on both the business and IT sides. IT management, at least, can clean up its act.

I said it was enough to make me scream. Is it enough to make you stop? ■

Bruce A. Stewart *is CEO of Vancouver, British Columbia-based Accendor Research Inc., an advisory services firm focused on management issues in the technology-enabled enterprise. He can be reached at bruce.stewart@accendor.com.*



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Georgia State University

Students choose management or technical tracks.

BY THOMAS HOFFMAN

WHEN Puneet Bhargava began evaluating part-time IT-oriented MBA programs in the Atlanta area in 2004, he considered factors such as the economic impact the program could have on his career and the types and structure of the classes that were being offered.

"From an overall value standpoint, I thought Georgia State offered the best value," says Bhargava, a senior consultant in Accenture Ltd.'s e-commerce practice. It wasn't just that Georgia State's program was affordable (annual tuition is just under $8,000 for in-state students and about $25,000 for out-of-state students). The curriculum at Georgia State was also well balanced between technical and business-focused materials.

www2.cis.gsu.edu

The business management coursework at Georgia State "worked very well [to complement] my technical background," says Bhargava, who worked for five years as a programmer and product manager at Worldspan LP after graduating from the Kamla Nehru Institute of Technology in India in 1999 with a bachelor of technology degree in electrical engineering. "The case studies that were being discussed in the classroom broadened my vision in the business world," says Bhargava.

For example, he points to a recent project for one of Accenture's manufacturing clients in which the customer's executives were providing scant input on the project requirements and desired outcomes. Bhargava says he was able to apply advice he'd learned about achieving stakeholder buy-in from his project management courses at Georgia State to help organize regular meetings with executive sponsors at the manufacturer and "bring them into the loop."

Mike Obideny, a 2007 Georgia State graduate with an MBA in information systems, was also pleased with the flexibility of the curriculum. "They give you a lot of choices — you can either take more technical classes or more management classes," says Obideny, who has been working as a consultant in the U.S. on an H-1B visa since obtaining a bachelor's degree in IT from Russia's Moscow Power Engineering Institute in 2000. "You can't expect that [kind of choice] from a two-year, full-time [graduate] school where they tell you what courses to take."

Georgia State offers its students a great deal of choice — ranging from a newly minted one-year, 12-course IT graduate program being offered on Saturdays beginning this fall to curricula tailored to better meet the needs of employers.

For example, in 2007 the university launched a master of science degree in information systems audit and control. The 10-course program, developed with the school's accounting department, was spurred by demand from Big Four accounting firms for business professionals who are trained to audit information systems, says Ephraim McLean, chairman of the computer information systems department at Georgia State's J. Mack Robinson College of Business.

Value

Positive career impact

Relevance to actual career activities

"One of the things we find from our board of advisers is a shift away from things like marketing and financial systems and more of a move into a process view of a firm," says McLean.

The program has been a boon for Obideny, who figures the $20,000 cost of his Georgia State degree should pay for itself through raises and bonuses he expects to earn at Deloitte Consulting over the next year.

Says Obideny, "If I wasn't in this school, I wouldn't have landed this job." ■

University of Pennsylvania

The curriculum is geared toward computer science neophytes.

BY THOMAS HOFFMAN

www.cis.upenn.edu/grad/mcit

LIKE MANY IT professionals, Nora Apsel doesn't have a background in computer science. After graduating with a bachelor's degree in biology from Emory University in 2004, Apsel, 25, started working for a nonprofit antihunger organization, and her involvement in database management and Web development stoked her interest in IT.

So when Apsel decided to pursue IT graduate studies, the program at the University of Pennsylvania was a natural fit. Penn's master's in computer and information technology (MCIT) program is specifically designed for people who don't have an undergraduate degree in computer science.

"This program is really geared toward people who have no background in technology," says Apsel, who is slated to graduate from Penn this fall.

"I wanted to be able to use this degree and enter any field I wanted to and not necessarily be tied to my biology degree and have to enter science," she adds.

In the late 1990s, university officials decided "there was too much homogeneity in the computer science program," says David Matuszek, director of Penn's MCIT program. Instead, the school wanted to draw graduate students from a variety of backgrounds, including chemistry, law and history. "We've even had a classical pianist major in our program," he says.

Since students enter the program with varying degrees of computer science knowledge, Penn provides extra help for neophytes to ensure that all students "are on the same page by the end of the first semester," says Matuszek.

Saajan Patel, a 2007 MCIT graduate who's currently pursuing a master's degree in computer science at Penn, says he learned the basic concepts of object-oriented programming and Java in the MCIT program, as well as "the things you're expected to do in a job," such as documenting code.

Value

Positive career impact

Relevance to actual career activities

Patel, who graduated from Georgetown University in 2002 with a double major in mathematics and economics, has worked in Penn's phonetics lab, and he hopes to begin a career in computational linguistics and language processing after he obtains his second master's degree in the fall of 2009.

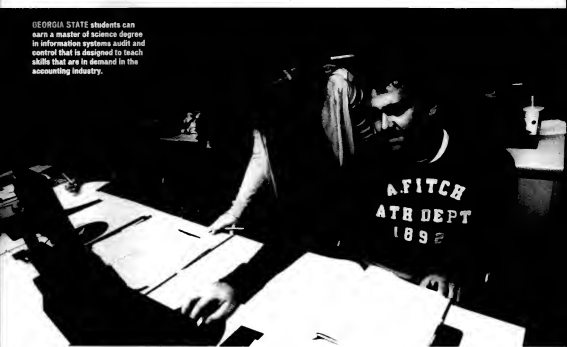
"I had considered pursuing a bioterrorism degree at Georgetown, but I decided that I wanted to pursue [IT] studies that wouldn't box me in careerwise," he says.

Ashley Emmons, another Penn MCIT student, says she's been able to apply best practices she's learned at the school, such as systems documentation and writing test methods, while participating in an internship this summer. She is working on a development team at Primavera Systems Inc., a provider of project and portfolio management tools.

"I've been very happy with the program. It's a great learning environment," says Emmons, who obtained a bachelor's degree in mathematics in 2006 from Haverford College in Pennsylvania.

Even though Penn's MCIT program caters to non-computer-science majors, it doesn't pamper them.

"What's very important about this program is how challenging it is," Apsel says. "The program doesn't baby you. [The faculty] expect you to take the initiative to teach yourself. It forces you to stand on your own." ■



GEORGIA STATE students can earn a master of science degree in information systems audit and control that is designed to teach skills that are in demand in the accounting industry.

Georgia State University

[illegible]

BY THOMAS HOFFMAN

Location: Atlanta
[illegible]

Department: Computer Information Systems

Program: M.S. in information systems

Key administrator: Ephraim R. McLean, department chairman

In-state tuition: $7,730

Out-of-state tuition: $25,444

HEN Puneet Bhargava began evaluating part-time IT-oriented MBA programs in the Atlanta area in 2004, he considered factors such as the economic impact the program could have on his career and the types and structure of the classes that were being offered.

"From an overall value standpoint, I thought Georgia State offered the best value," says Bhargava, a senior consultant in Accenture Ltd.'s e-commerce practice. It wasn't just that Georgia State's program was affordable (annual tuition is just under $8,000 for in-state students and about $25,000 for out-of-state students). The curriculum at Georgia State was also well balanced between technical and business-focused materials.

The business management coursework at Georgia State "worked very well [to complement] my technical background," says Bhargava, who worked for five years as a programmer and product manager at Worldspan LP after graduating from the Kamla Nehru Institute of Technology in India in 1999 with a bachelor of technology degree in electrical engineering. "The case studies that were being discussed in the classroom broadened my vision in the business world," says Bhargava.

For example, he points to a recent project for one of Accenture's manufacturing clients in which the customer's executives were providing scant input on the project requirements and desired outcomes. Bhargava says he was able to apply advice he'd learned about achieving stakeholder buy-in from his project management courses at Georgia State to help organize regular meetings with executive sponsors at the manufacturer and "bring them into the loop."

Mike Obideny, a 2007 Georgia State graduate with an MBA in information systems, was also pleased with the flexibility of the curriculum. "They give you a lot of choices — you can either take more technical classes or more management classes," says Obideny, who has been working as a consultant in the U.S. on an H-1B visa since obtaining a bachelor's degree in IT from Russia's Moscow Power Engineering Institute in 2000. "You can't expect that [kind of choice] from a two-year, full-time [graduate] school where they tell you what courses to take."

Georgia State offers its students a great deal of choice — ranging from a newly minted one-year, 12-course IT graduate program being offered on Saturdays beginning this fall to curricula tailored to better meet the needs of employers.

For example, in 2007 the university launched a master of science degree in information systems audit and control. The 10-course program, developed with the school's accounting department, was spurred by demand from Big Four accounting firms for business professionals who are trained to audit information systems, says Ephraim McLean, chairman of the computer information systems department at Georgia State's J. Mack Robinson College of Business.

OVERA [illegible]	B+
Value	B+
Positive career impact	A-
Relevance to actual career activities	B+

"One of the things we find from our board of advisers is a shift away from things like marketing and financial systems and more of a move into a process view of a firm," says McLean.

The program has been a boon for Obideny, who figures the $20,000 cost of his Georgia State degree should pay for itself through raises and bonuses he expects to earn at Deloitte Consulting over the next year.

Says Obideny, "If I wasn't in this school, I wouldn't have landed this job." ■

University of

[illegible]

Location: Philadelphia

Department: Computer and Information Technology

Program: Master of computer and information technology

Key administrator: David Matuszek, director

In-state and out-of-state tuition: $33,356

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[illegible]	A
Value	A
Positive career impact	A-
Relevance to actual career activities	A-

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University of

[illegible] McIntire [illegible] draws [illegible] executives

BY THOMAS HOFFMAN

Location: Charlottesville, Va.

Department: McIntire School of Commerce

Program: M.S. in the management of information technology

Key administrator: Carl P. Zeithaml, dean

In-state tuition: $34,900

Out-of-state tuition: $39,900

[illegible] up the career ladder since he graduated with a bachelor's degree in electrical engineering from the University of Notre Dame in 1997. After spending the first few years of his career in entry-level IT consulting roles, Day joined a start-up technology firm in the Washington area as head of software development. He then ran IT for a small mutual-funds firm before joining In-Q-Tel, a federally funded venture capital group, where he helped identify emerging technologies.

OVERALL GRADE	A
Value	A
Positive career impact	A
Relevance to actual career activities	A

In 2004, after having mulled the idea for a few years, Day decided to pursue a master's degree in IT management. "I'd already reached some IT leadership positions, and I felt this could help propel me to the next level," says Day.

After scoping out a variety of MBA and IT graduate programs around the Beltway, Day enrolled at the University of Virginia's McIntire School of Commerce, where he obtained a master's of science degree in the management of IT in August 2006.

The coursework at the school "was very relevant to my day job," says Day, who became chief technology officer at The Motley Fool in April. "Oftentimes, the stuff that I studied on Saturday [in class] I could put into effect in the office on Monday," he says. For instance, Day's coursework, which delved into strategic IT management issues ranging from risk management to disaster recovery, has enabled him to fill knowledge gaps he had in areas such as business intelligence.

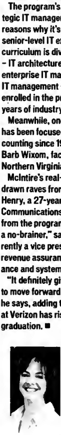
"The curriculum helped ground me and make me a more effective communicator," he says. And a better compensated one at that. Day estimates that since he graduated, his base salary has risen 15% to 20%, while his bonus package has swelled by similar proportions.

The program's concentration on strategic IT management issues is one of the reasons why it's such a big draw among senior-level IT executives like Day. The curriculum is divided into four core areas – IT architecture, IT project management, enterprise IT management and strategic IT management – and the typical student enrolled in the program has more than 12 years of industry experience.

Meanwhile, one-third of the curriculum has been focused on finance and accounting since 1999, says professsor Barb Wixom, faculty director for the Northern Virginia section of the program.

McIntire's real-world curriculum has drawn raves from alumni such as Charles Henry, a 27-year IT veteran at Verizon Communications Inc. who graduated from the program in 2003. The value "is a no-brainer," says Henry, who is currently a vice president responsible for revenue assurance, quality billing assurance and systems automation.

"It definitely gives you the leverage to move forward in your organization," he says, adding that his compensation at Verizon has risen 15% to 20% since graduation. ■



We believe that we need to develop business leaders who can speak many languages.

FACULTY DIRECTOR

University

BY THOMAS HOFFMAN

Location: Bloomington, Ind.

Department: School of Informatics

Programs: M.S. and Ph.D. programs in informatics/ computer science

Key administrator: Robert B. Schnabel, dean

In-state tuition: $5,687

Out-of-state tuition: $15,738

T'S DIFFICULT to imagine any industry these days where IT doesn't play some kind of role as a business enabler. And while many graduate IT programs provide students with real-world IT experiences either through case-study assignments, capstone projects or internships, few if any schools can tout the kind of interdisciplinary approach that Indiana University's School of Informatics has taken.

The school's master's program, launched in 2001, offers students specialized degrees in disciplines ranging from chemical informatics to bioinformatics and even music informatics. "One of the things we did in the creation of the school was to come at it from an interdisciplinary approach," says Marty Siegel, a professor in the school's Department of Informatics, which claims to have launched the nation's first doctoral program in informatics in 2005.

IU's roots in informatics extend back a few decades. In the late 1980s, while he was attending the University of Virginia as an undergraduate philoso-

University of Virginia

A focus on strategic IT issues draws senior executives.

BY THOMAS HOFFMAN

www.commerce.virginia.edu

SCOTT DAY HAS MOVED up the career ladder since he graduated with a bachelor's degree in electrical engineering from the University of Notre Dame in 1997. After spending the first few years of his career in entry-level IT consulting roles, Day joined a start-up technology firm in the Washington area as head of software development. He then ran IT for a small mutual-funds firm before joining In-Q-Tel, a federally funded venture capital group, where he helped identify emerging technologies.

Value

Positive career impact

Relevance to actual career activities

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> **"We believe that we need to develop business leaders who can speak many languages.**
> BARB WIXOM,
> FACULTY DIRECTOR

Indiana University

Specialized degrees showcase an interdisciplinary plan.

BY THOMAS HOFFMAN

www.cs.indiana.edu/Academics/graduate/programs/

IT'S DIFFICULT to imagine any industry these days where IT doesn't play some kind of role as a business enabler. And while many graduate IT programs provide students with real-world IT experiences either through case-study assignments, capstone projects or internships, few if any schools can tout the kind of interdisciplinary approach that Indiana University's School of Informatics has taken.

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IU's roots in informatics extend back a few decades. In the late 1980s, while he was attending the University of Virginia as an undergraduate philosophy major, Gary McGraw attended a lecture given by professor Douglas Hofstadter, a Pulitzer Prize-winning author, researcher and scholar in artificial intelligence and cognitive science from IU.

McGraw, who's now chief technology officer at Cigital Inc., a security software provider in Dulles, Va., was captivated by Hofstadter's remarks, and he decided to enroll in IU so he could study under Hofstadter. McGraw later obtained his Ph.D. in computer science and cognitive science in 1995 in a program that was the precursor to the School of Informatics.

IU "doesn't just pay lip service to interdisciplinary education — they live it, they do it," says McGraw, who has served on the dean's advisory council to the school for the past four years.

"As the CTO of a high-tech company who has to hire people out of these programs, I can tell you that if you get taught to think and analyze and understand the humanity behind the technology, you're going to be better suited to work in the real world," says McGraw, who joined Cigital in 1995.

"The informatics program sets people up for success.

GARY MCGRAW, CTO, CIGITAL

Josh Evnin agrees with McGraw. Evnin, an interaction designer/consultant at ThoughWorks Inc., an IT consulting firm in Chicago, says he ultimately selected IU's master's program in human-computer interaction (HCI) over those of other schools because of the responsiveness of its faculty and the students.

"They didn't just e-mail me back with yes or no responses to my questions," says Evnin, who graduated in 2006. "They really seemed to open up with genuine answers."

There were other differences, too. "I felt we were practically applying our thoughts and research to difficult problems. It was the creative aspect that stood out for me," says Evnin, who received a full scholarship to pursue a master's degree at IU.

Prior to studying at IU, Evnin received a bachelor's degree in cognitive science with a specialization in HCI from the University of California, San Diego, in 2004.

"As an undergraduate, I looked into jobs at places like Yahoo, and I don't think I qualified for those sorts of roles," he says. "Now, when I send résumés to places like that, I'm taken fairly seriously."

The financial returns of attending the program have been "incalculable" for McGraw, who, like Evnin, received a full scholarship to attend IU.

"It's hard to put a price tag on a solid educational background," says McGraw. "The informatics program sets people up for success. We're trying to create these next-generation technologists, and there's just unbelievable demand for that now." ■

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University

BY MARY BRANDEL

Location: Pittsburgh

Department: Human-Computer Interaction Institute

Program: Master's in human-computer interaction

Key administrator: Daniel P. Siewiorek, director

In-state and out-of-state tuition: $50,000

HEN Sara Culberson arrived at Carnegie Mellon University straight off a red-eye flight from her California home in 2003, it was sight unseen. But she soon fell in love not just with the school but with the human-computer interaction program she had enrolled in. "It had such a good reputation, I didn't even need to see it," she says.

It's true that CMU is considered one of the top schools offering a master's program in human-computer interaction. Six of its faculty are members of the Association for Computing Machinery's CHI Academy. That's more CHI Academy members than any other organization has, according to Bonnie John, a professor and director of the master's in HCI program, which trains students for careers in user interface and usability engineering, systems development and interaction design.

CMU's School of Computer Science offers various "professional" master's degrees — in entertainment technology, e-business technology, software engineering, software engineering management, IT with a specialization in very large information systems, robotics, IT service management, IT-embedded software engineering and an MBA track in technology leadership. All the programs are intended to lead to industry positions rather than to research or academic appointments, although CMU also offers several academic master's degrees.

That professional orientation meant a lot to Madhu Prabaker, who earned a master's in HCI and is now a usability analyst at Salesforce.com Inc. "It teaches in a way that's actionable," he says. "I was able to just hit the ground running, even my first week in." Prabaker says he learned what it was like to operate in a real-world scenario, complete with time and resource constraints.

A VIEW TO OTHER DISCIPLINES

Both Prabaker and Culberson entered the program with undergraduate degrees in cognitive science. The stated goal of the master's in HCI is to take excellent students with depth in a discipline relevant to HCI and enable them to — as John says — "walk in the shoes" of the other disciplines applicable to HCI, which are behavioral science, design and technology. "Everyone must program all night to find that last bug, everyone runs tests with users who do things they never could have predicted, and everyone designs and is subjected to critiques by faculty and peers," John says.

OVERALL GRADE	A
Value	A
Positive career impact	A+
Relevance to actual career activities	A

Elective courses are based on the student's background and can be taken in any college in the university. For instance, John says, she approved a freshman-level photography course for a student who was a computer scientist, and she has sent students off-campus to an art film college. Both Prabaker and Culberson chose design-oriented electives.

All these skills culminate in an eight-month "capstone project," which is longer and more intense than similar programs at other schools, John says, because the complexity and scope of the projects themselves can be greater. In fact, the projects are so complex that the teams (commonly four or five students) absolutely have to work together to complete it — there's no way for students to break off and work independently, which John says helps them in the real world. "It's the notion of working with the same people whether you like them or not," she says.

As far as Culberson is concerned, it was an "absolutely amazing experience." After graduating in 2004, she spent three years as an interaction designer at eBay Inc., and she is now a principal interaction designer at LinkedIn Corp. Compared with her days as a product manager for several Internet companies during the dot-com boom and then as a financial adviser during the bust, she's made a huge leap in salary, she says. "Never could have I have predicted it would have been such a great year, and so great for my career," she says.

Culberson also liked the fact that the program is 12 months long rather than two years, like those at other schools. "For 12 months, I was able to live and breathe HCI," she says, noting that a desire to avoid paying two years' of tuition was another reason she was drawn to CMU.

Students from CMU's HCI Institute are much in demand, both Prabaker and Culberson say, with job offers flowing in before students even graduate. The school works to open those doors, sending students to the international CHI conference, where networking opportunities abound.

"I think everyone who graduated in my class got exactly the job they wanted," Prabaker says. "A lot of us were getting job offers in February, and companies like Google are hiring right on campus." Four of the students in Culberson's class were hired by eBay; in fact, Prabaker says, "it's hard to find a Bay Area company with a user experience team with someone who didn't graduate from CMU in the last five years." ■

Brandel *is a* Computerworld *contributing writer. You can contact her at marybrandel@verizon.net.*

Carnegie Mellon University

Students are trained for roles in behavioral science.

BY MARY BRANDEL

www.hcii.cs.cmu.edu

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Northeastern University

[illegible]

BY MARY BRANDEL

Location: Boston

Department: College of Computer and Information Science

Program: M.S. in computer science

Key administrator: Larry Finkelstein, dean

In-state and out-of-state tuition: $16,000 (for 16 credit hours)

ICHAEL GODIN had been working in IT for 10 years when he decided he wanted a change. A network administrator in California at the time, he wanted to be more involved in the business side of the company and even toyed with the idea of law school.

When he started researching his options, Godin realized he wasn't eager to abandon the technology experience he'd gained. That's when he stumbled on the information assurance degree, an interdisciplinary program at the College of Computer Science at Northeastern University that encompasses law, computer science, information security and business.

"I enrolled the first semester they offered it," Godin says. And he's glad he did. After graduating in 2007, he took a job two months later as a professional services consultant at Ecora Software Corp., which makes compliance and auditing software, and his salary rose 10% over his previous income.

One of two interdisciplinary courses of study offered to IT graduate students, the information assurance program taps the college's computer science expertise, as well as security expertise within the College of Criminal Justice. "We emphasize that security is never a black-and-white issue but a trade-off issue," says Agnes Chan, a professor, associate dean and graduate director.

Godin says the course content and dialogue among students strongly reflected the working world as he knows it. "The class discussions about IT management were literally like listening to a narrative of my day-to-day encounters at work," he says. However, it was the guidance on how to deal with common problems that was exceptionally beneficial, he notes.

The school's other interdisciplinary program is its master's in health informatics, which enrolled its first students in the fall of 2007. The curriculum was developed in conjunction with Northeastern's Bouve College of Health Sciences, and its objective is to educate students about the use of technology in the health care industry.

Northeastern has also worked to incorporate real-life experience into its traditional master's in computer science. A new required course, Program Design Paradigm, gives students a hands-on opportunity to build software systems. They are expected not only to write code, but also to defend it in front of the other students. "We keep hearing from the industry that tech people can't communicate," Chan says. "So we wanted to improve our courses on providing as much opportunity as possible for students to carry out not just written but oral communications."

It also helps that 80% of the graduate faculty has worked or consulted in the industry during their careers. And Northeastern offers a well-known co-op program, in which students break from their studies to work full time for up to three semesters. Chan says 70% of master's students choose to participate in that program, and 100% are placed.

Mansi Rajkondawar just finished a co-op at Goldman Sachs and feels she was well prepared for the experience. Her coursework at Northeastern included a project to create a tool that could predict which movies people would most like to watch, based on previous preferences. During the co-op recruitment process, she says, she was in demand because of that experience.

We emphasize that security is never a black-and-white issue, but a trade-off issue.

PROFESSOR, ASSOCIATE DEAN AND GRADUATE DIRECTOR

Godin notes that the program taught him how to communicate with business people. "I have a tool belt that I built over two years of the program, so I know what to focus on," he says. ■

Northeastern University

A streamlined system helps it develop and deliver innovative curricula fast.

BY MARY BRANDEL

www.ccs.neu.edu

MICHAEL GODIN had been working in IT for 10 years when he decided he wanted a change. A network administrator in California at the time, he wanted to be more involved in the business side of the company and even toyed with the idea of law school.

When he started researching his options, Godin realized he wasn't eager to abandon the technology experience he'd gained. That's when he stumbled on the information assurance degree, an interdisciplinary program at the College of Computer Science at Northeastern University that encompasses law, computer science, information security and business.

"I enrolled the first semester they offered it," Godin says. And he's glad he did. After graduating in 2007, he took a job two months later as a professional services consultant at Ecora Software Corp., which makes compliance and auditing software, and his salary rose 10% over his previous income.

One of two interdisciplinary courses of study offered to IT graduate students, the information assurance program taps the college's computer science expertise, as well as security expertise within the College of Criminal Justice. "We emphasize that security is never a black-and-white issue but a trade-off issue," says Agnes Chan, a professor, associate dean and graduate director.

Godin says the course content and dialogue among students strongly reflected the working world as he knows it. "The class discussions about IT management were literally like listening to a narrative of my day-to-day encounters at work," he says. However, it was the guidance on how to deal with common problems that was exceptionally beneficial, he notes.

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PROFESSOR,
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Stanford University

Close industry ties open doors to job opportunities.

BY MARY BRANDEL

www.cs.stanford.edu

WHEN Neil Daswani began his dissertation on computer security at Stanford University, he was encouraged to focus on industry challenges rather than on an abstract issue. He chose Internet security as his topic, and in the process of completing his degree, he helped create an advanced security certification program that Stanford now offers. He later published a book on security foundations that is now standard issue for engineers at Google Inc., Daswani's current employer.

"Even though I was focusing on next-generation security for the Internet," he says, "they put me in a position where I could help companies solve security problems they have today." While at Google, Daswani has also focused on online advertising fraud and botnets such as Clickbot.A, a piece of malware written as a plug-in to Internet Explorer.

Indeed, while Stanford emphasizes the foundations of computer science in its coursework, it also aims to give students real-world experience, says Mehran Sahami, associate professor of computer science and director of educational affairs at the university. It does this through internships (for which he says students are aggressively recruited); events such as Yahoo's Hack Day and Google's coding competitions; organizations such as the Business Association of Stanford Engineering Students, which holds events like business-plan competitions; and the Mayfield Fellows Program, which is a work-study program aimed at developing entrepreneurial skills.

"We push more of that practical model, and what we require in the curriculum is foundational computer science skills," Sahami says.

"There's a lot more to school than courses and academics," Daswani adds.

Students are also exposed to the industry through seminars that host IT leaders and experts such as a founder of VMware Inc. Outside speakers are plentiful, given the school's numerous accomplished alumni. Many Stanford professors have also worked for the major players in the computer industry. Sahami has worked at Google and says that in his course on discrete math, he brings esoteric problems down to earth by showing how they're being tackled in the industry.

The faculty's industry experience also feeds back into the university's curriculum. For instance, as the need arises, Stanford offers courses to help students develop practical skills, such as .Net and client-side development expertise. Next year, it will offer courses on iPhone development. Coursework that explores how technology can help the aging population is also being developed.

FOCUS BEYOND TECHNOLOGY

Stanford also encourages active partnerships with other disciplines, including biology, genetics, linguistics and more. In the past few years, the computer science department has forged a joint graduate program with Stanford Law School, and a biomedical computation program with the medical school, and it has collaborated with the Stanford Institute of Design.

For Justin Manus, that interdisciplinary focus has paid off. While obtaining a graduate degree with a focus in artificial intelligence, he took two law-related electives, including one on intellectual property law and one on cyberlaw. After graduating in 2005, he went to work for Palm Inc., in driver development. He now serves as a director overseeing project management, development and quality assurance for one of Palm's smart-phone products.

The legal coursework has been valuable for writing vendor and outsourcing contracts, Manus says. "When I talk to the lawyers here, they understand some of the technology implications, and I understand enough about the legal implications, so together we can construct legal documents," he says. "It comes back to being a well-rounded person versus taking as many technology courses as I could." ■

Polytechnic Institute of New York University

Its information security lab gives students hands-on experience.

BY THOMAS HOFFMAN

www.poly.edu/cis/

WHEN STAN NURILOV attended Polytechnic Institute of New York University in an accelerated bachelor's/master's of computer science program from 2002 to 2006, he truly enjoyed the technical courses he took in areas like operating systems and databases.

But it wasn't until he graduated and began working as a software developer/project leader for a branch of the U.S. military that Nurilov fully appreciated the project-level courses that taught him about leadership qualities.

"Those classes really help me when I need to work with customers and gain collaboration on projects," he says.

Nurilov is one of a few dozen Polytechnic students who have participated in a cybersecurity program funded by the National Institute of Standards and Technology. The program paid for Nurilov's last two years of tuition and his rent in exchange for his commitment to serve an internship and to work at a federal agency for two years.

The program, launched in 2005, has placed 45 undergraduate and graduate students into government security jobs over the past four years.

"We were covering security courses in 2002, and then we got active in the national push to beef up in this area, both in research and in education," says Stuart Steele, head of Polytechnic's department of computer and information science. "We put together an information security lab that gives people hands-on experience as well as theory. We evolved from there."

Another Polytechnic graduate, Monique Delmar, started at Northrop Grumman Corp. as a systems engineer in flight testing after obtaining a bachelor's degree in electrical engineering. But as she became more involved in systems testing and systems integration work, Delmar decided to return to Polytechnic to pursue her master's.

Value

Positive career impact

Relevance to actual career activities

The graduate-level coursework was immediately applicable for Delmar, whose employer covered 80% of her tuition. And even though Northrop Grumman would have covered 100% of her graduate tuition at another college, Delmar says she's glad she opted for Polytechnic.

"I'm in a different sector at Northrop Grumman since graduation," says Delmar, "and [the move] came with a nice 29% pay increase." ■

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University

BY MARY BRANDEL

Location: Stanford, Calif.
[illegible]
Department: Computer Science
Programs: M.S. and Ph.D. in computer science
Key administrator: William J. Dally, department chairman
In-state and out-of-state tuition: $34,800

HEN Neil Daswani began his dissertation on computer security at Stanford University, he was encouraged to focus on industry challenges rather than on an abstract issue. He chose Internet security as his topic, and in the process of completing his degree, he helped create an advanced security certification program that Stanford now offers. He later published a book on security foundations that is now standard issue for engineers at Google Inc., Daswani's current employer.

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Institute of New York University

BY THOMAS HOFFMAN

Location: Brooklyn, N.Y.

Department: Computer and Information Science

Program: M.S. in computer science and information systems engineering

Key administrator: Stuart Steele, department head

In-state and out-of-state tuition: $20,450

[illegible]	A
Value	A
Positive career impact	A
Relevance to actual career activities	A

attended Polytechnic Institute of New York University in an accelerated bachelor's/master's of computer science program from 2002 to 2006, he truly enjoyed the technical courses he took in areas like operating systems and databases.

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Rensselaer Polytechnic Institute

Students immersed in real projects with real clients.

BY MARY BRANDEL

www.rpi.edu/it

THE FIRST sign for Damyon Thompson that his master's of science in IT degree from Rensselaer Polytechnic Institute was going to pay off appeared right after his December 2004 graduation, when he had four job offers from IBM on the table. Then, three and a half years after accepting a position at IBM's Banking Center of Excellence in San Jose, he was chosen to fly to Vietnam and South Africa as part of the center's efforts to study emerging overseas markets. "That kind of assignment is usually reserved for people with more experience," he says. "But the program at RPI gave me a leg up, and I was able to hit the ground running."

It helped that Thompson had an IBM-sponsored fellowship at RPI and that he interned there during the summer. But he attributes his success to the real-world elements of Rensselaer's programming, which include professors with industry experience, guest speakers from companies such as Morgan Stanley and the Reserve Bank of India, classes that emphasize skills like developing business cases, and a highly regarded capstone program, in which small teams of students complete an actual IT project for a client company. The student teams compete for the projects — which involve strategic and business planning, systems development and technology implementation — by submitting proposals and résumés that clients can choose from.

"Students love it because they're working on something that's real and that companies need," says Gregory Hughes, professor of management and IT, who also served as vice provost for IT and developed the capstone course and the IT degree programs. In fact, a substantial number of students end up working for the companies that sponsor the projects, Hughes says. The program is so highly regarded that there are currently more requests for capstone projects than project teams to complete them.

According to Thompson, who completed a capstone project on Web development for a natural gas company in Albany, the experience enabled him to know how to attack projects "from womb to tomb" on his current job, he says.

To earn their graduate degrees from RPI, students are required to study five core areas and then choose from among eight concentrations and 68 electives.

Many courses are taught jointly with four other RPI schools, enabling IT students to study side-by-side with engineering, science, management and social science students.

Value

Positive career impact

Relevance to actual career activities

In response to the financial industry's need for graduates with a combination of computer science, higher mathematics and management skills, RPI recently added a concentration in financial engineering. Similarly, it has added a concentration in information security.

RPI has also been working with IBM on an interdisciplinary curriculum in the area of service science, management and engineering, which would prepare students to more systematically approach business process improvement and automation.

Pooja Daswani says the skills she learned at RPI were directly applicable to her job as a manager at Deloitte Touche Tohmatsu, where she accepted a full-time position after completing a

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Virginia Polytechnic Institute and State University

Broadening its course offerings broadens students' perspectives.

BY MARY BRANDEL

www.cs.vt.edu

WHAT DEEPT KUMAR values about his consolidated Ph.D. from Virginia Polytechnic Institute and State University isn't just the depth of knowledge he gained in bioinformatics and data mining, but also the breadth of study to which he was exposed. "There's a one-dimensionality in a lot of people who specialize in a field, but when you try to

talk with them about something different, they're out of their depth," he says.

Conversely, thanks to Virginia Tech's focus on interdisciplinary education, Kumar feels he can address a range of topics, including virtualization, information retrieval, usability and more. In fact, a key part of his research involved convincing the biologists he worked with that the algorithms he had developed were useful for discovering data patterns. That took patience, he says, and an understanding of how to break things down into simple terms. It also helped him to develop respect for people who don't understand computer science. "They know things you don't know, and you need to be respectful of what they want to do," he says.

"We want to serve as role models for integrating computer science across multiple disciplines in innovative ways.

DENNIS KAFURA, FORMER DEPARTMENT HEAD, VIRGINIA TECH COMPUTER SCIENCE DEPARTMENT

According to Dennis Kafura, former head of the Department of Computer Science at Virginia Tech and now a professor of computer science there, the program's strongest suit is its interdisciplinary collaboration, which spans everything from life sciences – it has programs in computational biology and bioinformatics – to human-computer interaction, creative arts and design, engineering, humanities, social science, business, education and government.

"We want to serve as role models for integrating computer science across multiple disciplines in innovative ways," Kafura says. (The new department head is Barbara Ryder, formerly of Rutgers University.)

In fact, students are free to choose from electives offered outside of computer science. For Jamika Burge, who completed a Ph.D. in computer science with a focus on human-computer interaction at Virginia Tech this year, that meant taking courses not just in software engineering and databases, but also in organizational psychology, high-level statistics and even French. "I found it helpful to branch out into these other areas," she says.

Value

Positive career impact

Relevance to actual career activities

Burge's adviser was a trained psychologist, and many of the professors in the Center for Human-Computer Interaction hail from disciplines outside of computer science, such as industrial engineering, music, education and art. "Those perspectives are brought to bear on how people interact with the world and with technology," Burge says. She is now pursuing postdoctoral work at Pennsylvania State University, where she's studying how people interact across wireless networks.

Virginia Tech also works to keep its curriculum innovative and geared toward solving the problems that graduates will encounter in the real world. Professors regularly exchange ideas with IT industry professionals through faculty summits and other networking opportunities, according to Kafura. This is reflected in the curriculum and through special one-off courses, available to more advanced students, that are focused on cutting-edge issues. After two years, these courses are integrated into the regular curriculum if students show sustained interest in them, he says.

The department has also created a course in which students use the IBM Cell processors found in Sony PlayStation 2 machines for scientific computing applications, in order to learn about high-performance computing. This is a prime example of new developments in computing translating into coursework, says Naren Ramakrishnan, director of graduate studies at Virginia Tech.

To gain experience, many students participate in summer internships, and it's common practice for students to present their papers at conferences. "This gives students in research mode a very strong motivation to learn and develop their presentation skills," says Kafura. ■

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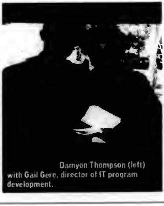
summer internship there and graduating in December 2005. "I literally use the skills I learned every day on the job," she says.

The most outstanding part of the program, Daswani says, is the career development resources offered to students. Not only did she have several job offers upon graduating, but she also scored an internship with no problem.

"The Career Development Center, faculty and advisers take a personal interest in helping you achieve your goals," Daswani says.

Rensselaer says its placement rate for internships is 100%, as was its 2007 placement rate for new positions, with most students taking jobs at Fortune 500 companies. And the extra schooling is worth it when you look at salary figures. The average salary for an RPI graduate with a bachelor's of science in IT is $62,500, and it's $74,800 for someone with a master's in IT.



Damyon Thompson (left) with Gail Gere, director of IT program development.

And even in the heart of Silicon Valley, Thompson feels the RPI mug that sits on his desk gives him instant credibility because of the program's quality. As far away as Vietnam, he says, he struck up a conversation with a stranger who recognized the RPI logo on his T-shirt. "People know it's a strong and rigorous program," he says. ■

Polytechnic Institute

BY MARY BRANDEL

Location: Troy, N.Y.

Department: Information Technology

Program: M.S. in information technology

Key administrator: Gail Gere, director, program development, IT

In-state and out-of-state tuition: $35,878

HE FIRST sign for Damyon Thompson that his master's of science in IT degree from Rensselaer Polytechnic Institute was going to pay off appeared right after his December 2004 graduation, when he had four job offers from IBM on the table. Then, three and a half years after accepting a position at IBM's Banking Center of Excellence in San Jose, he was chosen to fly to Vietnam and South Africa as part of the center's efforts to study emerging overseas markets. "That kind of assignment is usually reserved for people with more experience," he says. "But the program at RPI gave me a leg up, and I was able to hit the ground running."

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[illegible]	A-
Value	A
Positive career impact	A-
Relevance to actual career activities	A-

Polytechnic Institute and State University

BY MARY BRANDEL

Location: Blacksburg, Va.

Department: Computer Science

Program: M.S. in computer science

Key administrator: Barbara Ryder, department head

In-state tuition: $9,000

Out-of-state tuition: $16,500

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OVERALL GRADE	A-
Value	A-
Positive career impact	A
Relevance to actual career activities	B+

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To gain experience, many students participate in summer internships, and it's common practice for students to present their papers at conferences. "This gives students in research mode a very strong motivation to learn and develop their presentation skills," says Kafura. ■

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summer internship there and graduating in December 2005. "I literally use the skills I learned every day on the job," she says.

The most outstanding part of the program, Daswani says, is the career development resources offered to students. Not only did she have several job offers upon graduating, but she also scored an internship with no problem.

"The Career Development Center, faculty and advisers take a personal interest in helping you achieve your goals," Daswani says.

Rensselaer says its placement rate for internships is 100%, as was its 2007 placement rate for new positions, with most students taking jobs at Fortune 500 companies. And the extra schooling is worth it when you look at salary figures. The average salary for an RPI graduate with a bachelor's of science in IT is $62,500, and it's $74,800 for someone with a master's in IT.

RPI GRADUATE **Damyon Thompson (left) with Gail Gere, director of IT program development.**

And even in the heart of Silicon Valley, Thompson feels the RPI mug that sits on his desk gives him instant credibility because of the program's quality. As far away as Vietnam, he says, he struck up a conversation with a stranger who recognized the RPI logo on his T-shirt. "People know it's a strong and rigorous program," he says. ■

San Jose State University

SAN JOSE STATE UNIVERSITY'S charter is to produce educated workers for the local workforce, and that means Silicon Valley.

As a result, says Sigurd Meldal, chairman of the school's computer engineering department, students going for a master's degree in computer engineering or software engineering are expected to graduate with practical skills and hands-on experience. But it's important that they get good grounding in theory as well, he says. "You have to have the foundational theory or you die after five years in the workforce," he says.

www.engr.sjsu.edu/cmpe

All students must undertake a "capstone experience" that includes requirements definition, design, implementation and deployment, Meldal says. "Most do it with a local industry partner," he says. "It's a real project." In addition, about half of the faculty members come directly from the IT industry.

"My employer was very impressed with the designing, the application area and the technology that I used in my [master's degree] project," says SJSU graduate Deepti Lalwani, now an analyst at AT&T Inc. "Many companies are still trying to adopt the technology that I used. The program is oriented toward problem-solving, and each course gave me a lot of experience in thinking out of the box and approaching problems."

University Of Illinois At Urbana-Champaign

THE UNIVERSITY OF ILLINOIS at Urbana-Champaign not only teaches IT, it uses IT to teach. In its Illinois Internet Masters of Computer Science program, remote students visit the campus electronically, tapping into classes that are recorded and delivered via RSS feeds. Coursework requirements are the same as for on-campus students, and students may concentrate on security, networks and distributed systems, information systems, software engineering or system software.

www.online.uillinois.edu

Students in the e-learning program are IT professionals, ranging from programmers to managers, who typically have three to five years' experience, says Mehdi Harandi, director of the 10-year-old program. About two-thirds are from the U.S., and some could attend local schools but chose the UIUC Internet program because it can be accessed from the convenience of their homes or offices, he says.

The program is firmly grounded in the real world, Harandi says. For example, GE Healthcare supplements its internal software training program with UIUC courses. The university gives GE

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IT executive.

access to all of its core computer science courses and also pulls in online courses in bioinformatics from Northwestern University.

"I was employed full time during my study in the program," says Derwin Chow, a software engineer at WMS Gaming Inc. "The flexibility of the program allowed me to pursue the degree without putting a halt to my career development, and the impact on my work schedule due to coursework was minimal. My boss at that time was very supportive in helping me by proctoring my exams, but I never had to take time off to travel for school."

University of Washington

IN ITS REPORT "CYBERCITIES 2008," the AeA said that Seattle led the nation in net new technology jobs in 2006, adding 7,800 people to the local tech workforce. Indeed, the Washington offices of Microsoft, Amazon.com, Adobe Systems, Google and Intel say a lot about the opportunities for graduates of the University of Washington.

Says Jeff Dean, a UW graduate who is now a software engineer at Google, "Although I was focusing on compilers and programming languages for my Ph.D. research, I took classes and attended seminars in a bunch of other areas, including computer architecture, operating system design, distributed systems, algorithms and complexity theory, computer graphics and software engineering. This breadth is incredibly valuable at a company like Google, where many projects involve working across many disciplines."

"Our students do internships and collaborative research at Intel Research Seattle," says Ed Lazowska, a computer science professor at the university. "Ditto for Microsoft Research, and Google Seattle and Adobe Seattle. This extensive industry research involvement takes place throughout their graduate careers. Our faculty are involved with these companies, too – so the engagement is an integral part of the students' life, not something on the side."

– GARY ANTHES

www.cs.washington.edu

About the IT Schools to Watch

IN THE SPRING, *Computerworld* assembled a panel of more than two-dozen IT executives, hiring managers, recruiters and academics to help identify the country's leading-edge schools for IT workers. We asked the panelists to consider – based on reputation – graduate-level IT programs that are giving students the best value in terms of salary increases or promotions vs. cost of tuition, and that are best at gearing their coursework to the demands of today's IT workplace. From a total of 56 IT schools selected by the panel, a group of *Computerworld* editors chose the IT schools to profile. To determine the letter grades that accompany the profiles, *Computerworld* partnered with Dice.com to survey alumni of the schools, asking for feedback on their satisfaction with the program's positive impact on their careers and the relevance of course content to actual career activities. The featured schools are presented here in no particular order.

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Location:
San Jose

Department:
Computer Engineering

Programs: M.S. in software engineering, computer engineering

Key administrator:
Sigurd Meldal, professor and chairman

In-state tuition: $4,358

Out-of-state tuition:
$10,460

All students must undertake a "capstone experience" that includes requirements definition, design, implementation and deployment, Meldal says. "Most do it with a local industry partner," he says. "It's a real project." In addition, about half of the faculty members come directly from the IT industry.

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Location: Urbana, Ill.

[illegible]

Department: Computer Science

Program: Illinois Internet Masters of Computer Science (I2CS)

Key contact: Michael Heath, interim department head

In-state and out-of-state tuition: $6,408 to $12,816, depending on credit hours

Students in the e-learning program are IT professionals, ranging from programmers to managers, who typically have three to five years' experience, says Mehdi Harandi, director of the 10-year-old program. About two-thirds are from the U.S., and some could attend local schools but chose the UIUC Internet program because it can be accessed from the convenience of their homes or offices, he says.

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– GARY ANTHES

Location: Seattle

Department: Computer Science & Engineering

Program: Computer science & engineering

Key administrator: Hank Levy, chairman

In-state tuition: $3,139

Out-of-state tuition: $7,155

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Computerworld assembled a panel of more than two-dozen IT executives, hiring managers, recruiters and academics to help identify the country's leading-edge schools for IT workers. We asked the panelists to consider – based on reputation – graduate-level IT programs that are giving students the best value in terms of salary increases or promotions vs. cost of tuition, and that are best at gearing their coursework to the demands of today's IT workplace. From a total of 56 IT schools selected by the panel, a group of *Computerworld* editors chose the IT schools to profile. To determine the letter grades that accompany the profiles, *Computerworld* partnered with Dice.com to survey alumni of the schools, asking for feedback on their satisfaction with the program's positive impact on their careers and the relevance of course content to actual career activities. The featured schools are presented here in no particular order.

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Howard Rubin

IT Survivor

IMAGINE THIS: Without warning, you find yourself in an isolated place with only two pieces of paper (and perhaps an iPod, a BlackBerry or maybe an iPhone 3G). You find a desk and a virtual workstation, where the e-mails are already pouring in. Meanwhile, the phone is ringing and your calendar is filling up.

Where exactly are you? And what are those precious pieces of paper you're grasping? You're on "IT Island" — one of the newest enclaves in the corporate chain. The papers are a bachelor's degree (in almost any field) and a master's degree with a specialization in IT. You are now in the most real of reality events: "IT Survivor."

And with your master's in hand, you are part of a small group of specialists in the workforce with excellent chances for survival. Yes, this workforce segment has high turnover in management and high financial stress, as evidenced by recent budget trends. But at the same time, it's a segment with great ability to produce business value.

This last point — creation of business value with IT — is the key to survival on IT Island. It is also the key for sustainable success in a global economy.

In terms of business success and IT, it appears that even former Fed Chairman Alan Greenspan agrees. In remarks he made in January 2000 about technology and the economy, he said, "Information technologies, by improving our real-time understanding of production processes and of the vagaries of consumer demand, are reducing the degree of uncertainty and, hence, risk."

In short, IT raises output per hour in the total economy principally by reducing hours worked on activities. But not all technologies, information or otherwise, increase productivity — that is, output per hour — by reducing the inputs necessary to produce existing products. Some new technologies are bringing about new goods and services whose value per hour of work is above average.

■ Graduate IT education bridges technology and business and draws from the disciplines of strategy, technology and management.

It is in this context that we can best understand the value of graduate education that specializes in IT and how the best of the best have defined their academic programs. Graduate IT education, by design, bridges technology and business and draws from the disciplines of strategy, technology and management.

This "bridging" is a mechanism by which business needs are linked to technology strategy and effective execution and by which technology opportunities can be channeled into business innovation. This form of interdependence is perhaps what Peter Weil and the MIT Center for Information Systems Research team describe as a more highly evolved business construct — the "IT savvy" organization that outperforms its non-savvy peers.

Before the advent of graduate IT programs, people attained these important skills through apprenticeships or rare insight. Today, these skills can be taught in the classroom and reinforced through specialized studies, internships and "externships." In today's technology-based economy, the value of such knowledge and the ability to execute with it is priceless.

But back to the island . . . and IT Survivor. That second piece of paper, the master's in IT, is the training credential to outwit, outplay and outlast. Use it well. ■

Howard Rubin *is professor emeritus at City University of New York, CEO of Rubin Worldwide, a Gartner Inc. senior adviser and an MIT CISR research associate.*

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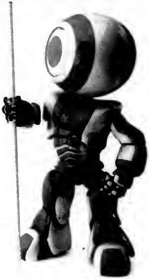

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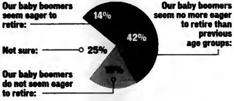
Career Watch

No Boomer Bust?

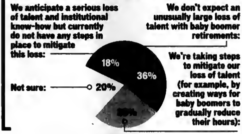
The assiduously chronicled baby boom generation has long been assumed to be more interested in early retirement than its predecessors, but a survey from late last year casts some doubt on that bit of conventional wisdom.

How would you characterize the attitude toward retirement of the baby boomers in your organization?



That being the case, the relative lack of urgency about a potential loss of institutional know-how at many companies is more understandable.

With respect to retiring baby boomers, how would you describe the situation at your organization?



SOURCE: NOVATIONS GROUP INC. ONLINE SURVEY OF 2,556 SENIOR HUMAN RESOURCE AND TRAINING AND DEVELOPMENT EXECUTIVES, DECEMBER 2007

Not Panicking

IT decision-makers' confidence is stable and even rising in some areas, according to the June CDW IT Monitor marketplace indicator.

	June 2008	April 2008
Our IT staffing will increase over the next six months.	26%	22%
Our IT budgets will increase over next six months.	50%	49%

SOURCE: CDW IT MONITOR, A SURVEY OF 1,041 IT DECISION MAKERS CONDUCTED BY RICHARD DAY RESEARCH INC.

■ ASK A PREMIER 100 LEADER

George A. Vega

The managing director and head of capital markets technology at **Wachovia Corporate & Investment Bank** answers questions about revitalizing careers, making a big leap and attaining valuable skills.

We're always reading that IT departments are desperate for good people with valuable skills. I am a seasoned veteran (read: "over 45") with experience in Oracle databases, SAP, networking and groupware, but I haven't had an interview in two years. Aren't these considered valuable skills anymore? The skills that you list are strong foundational skills and necessary for a position supporting a data warehouse, MIS reporting or a business intelligence function. I suggest you supplement these skills with OLAP and dimensional capabilities and target a vertical market.

COMPUTERWORLD.COM

QUESTION? If you have a question for one of our Premier 100 IT Leaders, send it to **askaleader@computerworld.com**, and watch for this column each month.

I've been on a help desk for three years, mostly doing Windows support. I want to move into more of an admin position. Any advice? Jumping across a job family requires an individual to self-access, invest in training and seek support or sponsorship for the move. I suggest you complete training and certification with Microsoft and Cisco. In parallel, I would participate with an informal mentor (a buddy) or formal mentor who is in the position you desire. Once your training is complete, ask to move into the admin functions supporting office productivity suites. That's generally a nice transition and path

What skill today is most likely to provide job security? There are a number of factors that create job disruption. My experience is that they are generally outside of the control of the individual. Having said that, it is important to continually invest in skills that are valuable to the marketplace. I suggest that any skills that enable services are valuable skills in the global environment we work in.

I have a good job as a project manager, but in the long term, I want to do more in the management line. What's the best way to move into higher management levels? Going back to school isn't a real option for me right now. I suggest you take a stretch assignment and participate in a team where you can develop your line skills and demonstrate situational leadership. This will surely provide the platform to get you recognized for a management job.

What's the best bit of career advice you've ever gotten? Surround yourself with high-quality people. These should be individuals you can trust, whose skill sets complement your own and who always seek to provide value.

PAGE COMPILED BY JAMIE ECKLE.

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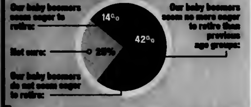

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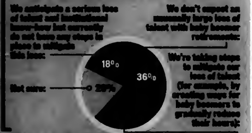

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International Monetary Fund

For its headquarters in Washington, D.C., the Technology and General Services Department (TGS) at the International Monetary Fund (IMF), an international organization with staff drawn from over 140 countries, is looking for qualified candidates to fill the positions of Information Technology Officer (Economic Systems) and Information Technology Officer (Infrastructure).

Information Technology Officer - Economic Systems Division

As a member of the Data and Metadata Collection and Exchange Services team of the Economic Systems Division of Technology and General Services Department, the Information Technology Officer (Technology Integration) will be required to lead a group of developers as they carry out various development and production maintenance projects. The focus of the systems entails web based applications for collection and dissemination of Statistical metadata for the member countries of the IMF. One such internet website is http://dsbb.imf.org.

Information Technology Officer – Infrastructure Services Division

As a member of the team of the Infrastructure Division of Technology and General Services Department, this Information Technology Officer (Technology Integration) specializes in the networking and security technology areas. The selected candidate will act as a technical lead for projects that require special focus and coordination in these areas, and will be involved in building and maintaining complex network and security infrastructure. Given the critical importance of both the networking and security areas to virtually all IT-related projects, this role requires significant integration across multiple technologies (e.g., application development, server and application hosting, workstation computing, etc.).

Qualifications:

The selected candidates for both positions are expected to possess an advanced university degree in computer science, engineering, mathematics or related field of study or equivalent, plus a minimum of four years of relevant professional experience; or a bachelor's degree in computer science or a related field of study plus a minimum of 10 years of relevant professional experience.

More detailed information is available on the IMF recruitment website: **www.imf.org/recruitment > Job Opportunities > Advertised Vacancies**. Interested candidates from any member country of the Fund are invited to apply online making explicit reference to **Vacancy No. R08672** for Information Technology Officer (Economic Systems) and **Vacancy No. R08673** for the position of Information Technology Officer (Infrastructure) by **August 29, 2008**. Only those selected for an interview will be contacted.

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TRUE TALES OF IT LIFE AS TOLD TO SHARKY

Vacation Time

Help desk pilot fish gets an urgent user request: "I set up a vacation rule, where a reply is automatically sent out when I receive something. Now that I'm back from vacation, I can't get it to stop sending out the automatic reply. I deleted all my rules, and it's still doing it. Can you please help?" Fish sends user an e-mail to see for himself – and gets no automated response. But user insists that her vacation rule is still running. "I asked her why she thought it was running," says fish. "Her reply? 'When I send myself an e-mail, I get a reply.' I asked, What does the reply say? It was at this point that she realized that when she sent herself an e-mail, what she was receiving was – drum roll, please – her e-mail."

One More Thing To Worry About

This pilot fish and his wife are planning a long-overdue vacation to an all-inclusive resort – one of those places where they won't have to worry about things like meals or tipping. "I log onto the resort's Web site in order to make some reservations ahead of our arrival and am presented with the standard registration page," says fish. "I enter my information on the page, and where the field says 'For security reasons, please select a password,' I set up a throwaway password. Belatedly, I look up to the address bar and realize that their page isn't encrypted. A conversation with their customer service department is less than fruitful, which doesn't surprise me much, and a transfer to their IT department is right out. The icing on the cake? I get an e-mail from them confirming my registration – and it contains my password in all its glory. Lessons learned: Never use the same password across systems. And remember that my idea of security may not match my vendor's ideas of 'security.' "

Just Like Vacation

It's the mid-1980s, and this fresh-from-school pilot fish happens to have some experience on a relatively rare type of mainframe – and a military outfit has a contract requiring that experience. "I get snapped up by one of the bidders on this contract in order to fill the role of 'on-site consultant' for the contract," says fish. "I'm flown across the country to undergo some intensive training. But when I arrive at the head office, it turns out someone misread the proposal. The client specifically does *not* want an on-site consultant, the whole purpose of the contract being to avoid such a position. I sort of stay at the head office, lost and unassigned, but for some reason still employed."

■ *Sharky's right here all summer long, so send me your true tale of IT life at sharky@computerworld.com. I'll send you a stylish Shark shirt if I use it.*

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■ FRANKLY SPEAKING

Frank Hayes

No Paper Chase

DON'T DO IT. Don't head off to one of the top schools profiled in *Computerworld*'s "IT Schools to Watch" in this issue. Don't spend a year in the classroom, or a couple of years of nights and weekends, to get your master's degree. At least, don't do that if your goal is just a bigger paycheck.

If you're just chasing paper, there are better ways to do it.

Yes, an IT-related master's will probably boost your salary. So would an MBA or a law degree. At the least, you can expect it to pay for itself within a few years.

But then, the same used to be true of a whole slew of IT-related certifications. The process was simple: Study up, fill out the workbook, pass the test. You'd get a new line to add to your résumé and a string of letters to tack onto your e-mail signature — and, usually, a hefty boost come payday.

Pretty soon, we had a glut of certified test-passers. That's when the value of certifications started to plunge. Employers began to look for practical experience, not just pieces of paper.

Understand, the problem wasn't merely an oversupply of certified IT people. There's a curve to these things. At the start, the people getting certifications wanted to take the next step. They were looking for an opportunity to solve problems others didn't know how to solve, to master a technology in ways their peers couldn't. The certification was just icing; the cake was the knowledge they gained.

The result? They gave certifications a good name. They really were worth more money, even though that wasn't what the people were looking for.

But money attracted the workbook-fillers, the test-passers, the résumé-padders — the people who just wanted to make a quick investment in a certification that would bump up their salaries. They weren't worth the money. In the end, they gave certs a bad name.

■ Don't do it. At least, don't just do it for the paper – the diploma and the money.

And those master's degrees? Right now, they look good. And they should. The people who have gone back to school in the first wave of IT-related graduate programs want to kick their abilities up a level or two. They have experience, but not the breadth of vision they'd like. They've proved they can solve problems, but they'd like more options.

They want a better grasp of how business and IT intersect and sometimes collide. They want depth, and knowledge, and leadership ability. Most of all, they want an edge that will give them and the people they work with a better chance at both IT and business success.

Yes, they'll make more money. And they'll be worth it. But not because of that piece of paper.

Eventually, that paper will lose its value, too. That'll happen because the money will attract paper-chasers, and we'll end up with a glut of people with IT-related master's degrees — and nothing else to offer.

So don't do it. At least, don't just do it for the paper — the diploma and the money.

But if you want an edge at the place where IT and business meet, and you're willing to stretch your knowledge and experience to gain that edge, maybe this is the way for you to get it.

Corporate IT isn't going to get any easier, any less complicated or challenging. We need people who can take it to the next level.

The baker's-dozen programs in "IT Schools to Watch" are a place to start looking. Kick some tires. Ask some questions. See who's got what you need — and if it's not in this bunch, expand your search.

Find a master's program that really will give you the opportunity to make a difference in your business.

And then do it. ■

Frank Hayes *is* Computerworld's *senior news columnist. Contact him at frank_hayes@computerworld.com.*

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